To	From
Abby Ebodaghe, GDOT-OEL	Keith McCage, P.E.
CC: Charles Robinson, GDOT PM	**Subject**
Dom Saulino, P.E., HNTB PM	Traffic Forecasting for
	PI No. 122200, Union County
	Date
	April 9, 2015

Technical Memorandum

1. INTRODUCTION

This memorandum summarizes the methodology and factors that will be used to forecast the future traffic volumes for the SR 11/US 19 & US 129 widening and reconstruction in Union County. The overall limits of the projects are SR 11/US 19 & US 129 from south of SR 515/SR 2/US 76 to SR 325/Nottely Dam Road/CR 237. It includes the following project:

STP000-0002-07(020), Union County
SR 11/US 129 From CR 304 North to CR 236

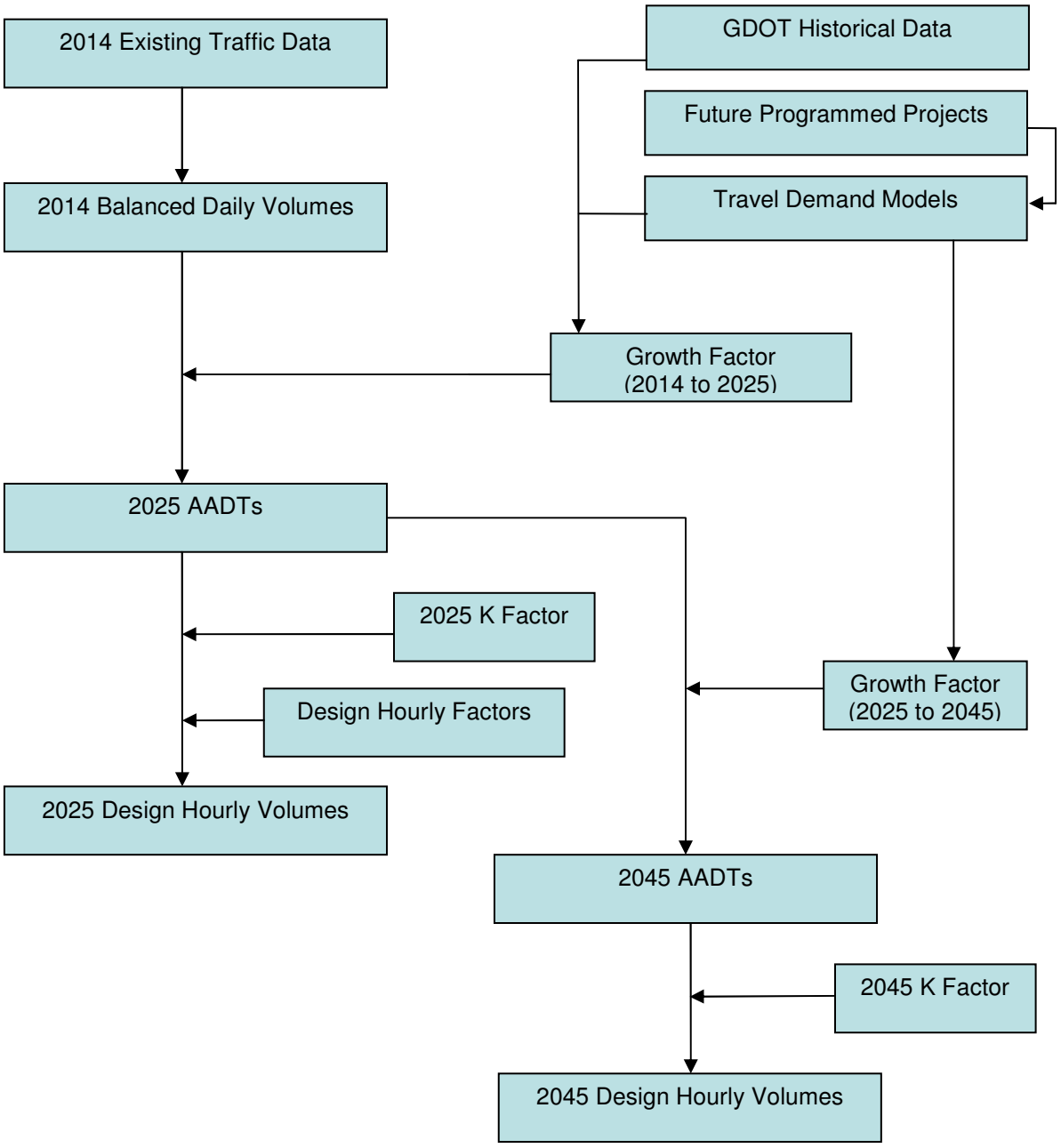
The Opening Year and Design Year for this project are 2025 and 2045, respectively. The forecasting process will result in Annual Average Daily Traffic (AADT) volumes and Design Hourly Volumes (DHVs) for 2025 and 2045.

2. METHODOLOGY

The traffic forecasting process will consist of the following steps:

- Collect weekday directional daily and hourly counts (classification) and hourly turning movement counts
- Compare collected volumes to GDOT historic counts and counts from GDOT automated traffic recorders (ATR).
- Balance traffic counts to adjust for daily and monthly variations
- Collect information related to programmed projects and review their potential impacts to future traffic growth
- Review GDOT historical traffic counts to assess traffic growth trends
- Review Statewide travel demand models to estimate future growth rates
- Apply growth factors to estimate AADT's for 2025
- Apply growth factors to convert 2025 AADT's to 2045 AADT's
- Adjust AADT volumes based on roadway capacity constraints
- Convert AADT's to DHV's for 2025 and 2045 using K factors

The traffic forecasting steps that will be taken for this project are illustrated in the following flow chart:



The following section describes the above steps in more detail including data collection and review of growth trends. **Section 3, Forecast Factors**, explains all the factors, including growth rates, design hourly factor, K factor, etc. that will be used to prepare these traffic projections.

2.1 Existing Traffic Data Collection

Existing traffic data were collected in the fall of 2014. See the table below for types of counts. In addition, an extensive traffic data collection was also done in 2007 and revised in 2010.

Quantity	Description
23	6-Hr Turning Movement Count
32	48-Hr Bidirectional Automatic Machine Count
16	48-Hr Bidirectional Automatic Machine Count with Classification

2.2 GDOT Historical Traffic Data and Historical Traffic Growth Trends

Historical traffic data (1999-2013) was collected from the GDOT permanent count stations data base. Data from nine stations in Union County was collected and analyzed.

- 4 stations on SR 11
- 2 stations on SR 515
- 1 station on SR 325
- 1 station on Gumlog Road
- 1 station on Pat Haralson Road

The annual growth rates over the last ten-year period indicated that the growth in traffic has been decreasing or flat for SR 11 and the intersection roads except for SR 515 which has been steadily growing.

2.3 Travel Demand Model Review

2010 and 2040 statewide travel demand models were reviewed. The statewide model is typically not as refined as a regional model but can be used to get a general idea of growth. A comparison of these two models was used as a factor in determining the future traffic growth in the project area. Traffic volumes from several links on SR 11 and SR 515 were collected and analyzed. Annual growth rates were calculated for the links. A comparison of the link data was done to determine future annual growth rate from the near term to long term. See attached table for more information.

3. FORECAST FACTORS

This section discusses the factors, including growth rates, K factors, and direction distribution that are proposed to be used to estimate 2025 and 2045 DHV's and AADT's.

3.1 Annual Traffic Growth Rates

Based on the review of GDOT historic data, it was decided to develop a uniform annual growth rate for SR 11 and the intersecting roadways except SR 515. Near term growth (2014 to 2025) was based on the GDOT Historical Data. Based on 10-year regression analysis, SR 11 and side roads have negative to flat growth rates except SR 515 which shows fairly strong growth. Long term growth (2025 to 2045) was based on the growth between 2025 and 2045 as predicted by the statewide travel demand model as well reviewing other planning data on population growth. The statewide model showed steady growth on SR 11 while SR 515 would see slower growth. Population data such as the data from the Georgia Office of Planning and Budget predicts Union County to be one of the strongest growing counties for the next 15 years. The following table summarizes the proposed annual No-Build growth rates.

PROPOSED NO-BUILD 2014-2025 AND 2025-2045 ANNUAL GROWTH RATES

Roadway	2014-2025	2025-2045
SR 11/US 19 & US 129	1.0%	1.5%
SR 515/US 76	1.7%	1.0%
All other roads	1.0%	1.5%

3.2 Build Growth Rates

The proposed widening of SR 11 would be expected to potentially spur development along the corridor which in turn would create additional growth as compared to the No-Build condition. The widening would also make trips into Blairsville easier which may induce additional trips. The impact to the SR 515 growth rate would not be as significant since the majority of traffic volume on SR 515 at the SR 11 intersection stays on SR 515. After consulting with GDOT Office of Planning the following proposed annual Build growth rates were developed.

PROPOSED BUILD 2014-2025 AND 2025-2045 ANNUAL GROWTH RATES

Roadway	2014-2025	2025-2045
SR 11/US 19 & US 129	2.0%	2.0%
SR 515/US 76	2.2%	1.5%
All other roads	2.0%	2.0%

3.3 K Factor and Directional Distribution

The existing K-factors and D-factors for the AM and PM peak hours were calculated based on the collected counts that were balanced and rounded. The factors in the below table are proposed to be used for future opening and design years as well. See attached map and table for count station details.

EXISTING VOLUMES, PROPOSED AM & PM K FACTORS, DIRECTIONAL DISTRIBUTION

Count Station	AADT		Peak Hour 7:15 AM				Peak Hour 4:45 PM			
	EB/NB	WB/SB	EB/NB	WB/SB	K	D	EB/NB	WB/SB	K	D
C101	2550	2550	35	175	6.1%	57%	250	195	8.7%	56%
C102	1000	1000	115	60	8.8%	66%	80	140	11%	64%
C103	850	850	25	65	5.3%	72%	110	70	10.6%	61%
C106	350	350	45	10	7.9%	82%	20	45	9.3%	69%
C107	3550	3550	160	330	6.9%	67%	410	220	8.9%	65%
C110	400	400	50	10	7.5%	83%	30	35	8.1%	54%
C112	3800	3800	180	390	7.5%	68%	445	250	9.1%	64%
C114	1250	1250	40	150	7.6%	79%	135	90	9.0%	63%
C117	4900	4900	220	560	8.0%	72%	580	335	9.3%	63%
C124	5100	5100	230	590	8.0%	72%	605	365	9.5%	62%
C125	250	250	10	40	10%	80%	30	20	10.0%	60%
C128	1550	1550	165	100	8.5%	62%	145	185	10.6%	56%
C130	6250	6250	300	760	8.5%	72%	705	430	9.1%	62%
C131	2100	2100	335	130	11.1%	72%	115	240	8.5%	68%

Count Station	AADT		Peak Hour 7:15 AM				Peak Hour 4:45 PM			
	EB/NB	WB/SB	EB/NB	WB/SB	K	D	EB/NB	WB/SB	K	D
C137	250	250	10	10	4.0%	50%	35	25	12.0%	58%
C138	1000	1000	15	30	2.3%	67%	90	110	10.0%	55%
C139	5450	5450	265	485	6.9%	65%	620	465	10.0%	57%
C141	500	500	15	30	4.5%	67%	70	110	18.0%	61%
C142	7950	7950	565	445	6.4%	56%	655	815	9.2%	55%
C143	9100	9100	670	465	6.2%	59%	685	1025	9.4%	60%
C144	3900	3900	350	230	7.4%	60%	350	350	9.0%	50%
C145	1950	1950	190	115	7.8%	62%	195	195	10.0%	50%
C146	4550	4550	470	290	8.4%	62%	380	365	8.2%	51%
C147	1000	1000	20	35	2.7%	64%	125	110	11.8%	53%

Note: Only roads with at least 500 AADT are shown, count stations shown in bold are on SR 11/Murphy Hwy.

3.4 Truck Percentages

The existing truck percentages for Daily and the AM and PM peak hours were calculated based on a review of the collected counts as well as GDOT counts and previous counts. It is proposed in the below tables to use these factors for future opening and design years as well.

PROPOSED TRUCK PERCENTAGES

Roadway	Daily			Peak Hour		
	24hr T %	S.U. %	COMB. %	T %	S.U. %	COMB. %
Blue Ridge St., East of Murphy Highway	7.5	6.4	1.1	6.1	5.6	0.5
SR 11/US 19, South of SR 515/US 76	9.7	8.4	1.3	8.7	7.7	1.0
SR 515/US 76, West of SR 11/US 19	8.0	6.3	1.7	7.0	5.0	2.0
Pat Haralson Memorial Drive, East of SR 11/US 19	8.3	8.0	0.3	8.4	8.3	0.1
SR 11/US 19, South of Pleasant Hill Road	9.7	8.8	0.9	10.9	10.0	0.9
SR 11/US 19, South of Old Gumlog Road	7.3	6.3	1.0	7.2	6.2	1.0
SR 11/US 19, North of Mauney Road	10.1	9.0	1.1	8.7	7.9	0.8
SR 325, West of SR 11/US 19	6.7	6.3	0.4	3.6	3.4	0.2
SR 11/US 19, North of SR 325	9.0	7.7	1.3	7.6	6.2	1.4